



Insight and theory of mind in schizophrenia



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ABSTRACT

Theory of mind (ToM) impairment is common in individuals with schizophrenia and is associated with poor social functioning. Poor insight has also been linked to poor outcome in schizophrenia. Social developmental research has shown representations of self (insight) and representations of others (ToM) are related. In schizophrenia, contradictory reports of associations between insight and ToM have emerged, possibly due to a failure to account for neurocognitive impairments and symptoms associated with both mentalization constructs. This study investigated the relationships between ToM (intentions of others on the Hinting Task) and clinical and cognitive insight, while accounting for shared variance with neurocognitive impairment and symptom severity in 193 individuals with schizophrenia. Clinical, but not cognitive, insight was associated with ToM. A unique association between Awareness of Mental Illness and Hinting Task performance was found, independent of shared variance with neurocognition and symptoms. Importantly, ToM was found to mediate Awareness of Mental Illness and neurocognition. Results suggested that treatments targeting mentalization abilities that contribute to representations of self and others may improve insight deficits associated with poor outcome in schizophrenia.

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1. Introduction

Theory of mind (ToM; also called mental state attribution) is “the ability to infer intentions, dispositions and beliefs of others” (Green et al., 2008). This ability to understand the mental states of others is important for a variety of social functions, including understanding pragmatic speech, pretending, deception, imagining, understanding jokes, and empathy (Corocan, 2001; Sperber and Wilson, 2002; Shamay-Tsoory et al., 2007). Several studies have found ToM deficits in individuals with schizophrenia (e.g., Corcoran et al., 1995; Garety and Freeman, 1999; Green et al., 2008), and this impairment has been shown to be associated with social functioning and social competence in schizophrenia (Roncone et al., 2002; Brüne, 2005; Couture et al., 2006, 2011; Brekke et al., 2007; Brüne et al., 2007; Green et al., 2008). Therefore, ToM may be an important treatment target to improve real-world functioning in schizophrenia.

Poor insight has also been linked to poor outcome in schizophrenia (Amador et al., 1991; Lysaker et al., 2002; Erikson et al., 2011; Giugiaro et al., 2012; for a recent review, see Lincoln et al. (2007). Insight has been widely regarded as a multidimensional construct

(Amador et al., 1991). Clinical insight refers to one’s awareness of having a mental illness that requires treatment, and includes dimensions of Awareness of Illness, Relabeling of Symptoms, and Need for Treatment, which have been differentially associated with neurocognition and clinical symptoms (Konstantakopoulos et al., 2013). Cognitive insight involves metacognitive processes of re-evaluation and correction of distorted experiences (e.g., objective distancing and reappraisal of symptoms), and includes dimensions of Self-Reflectiveness and overconfidence in beliefs (Beck et al., 2004). Clinical and cognitive insight appear to be distinct constructs with different neurocognitive correlates (Nair et al., 2014). Clinical insight presumably requires metacognitive processes associated with cognitive insight (Beck et al., 2004).

Social developmental researchers have long posited that representations of self and others’ mental states are inextricably connected. Developmentalists propose that self-representations stem from experiential learning, reflection, and extensive engagement in social interactions, and as such, understanding others’ motives, beliefs and actions aids in our own self-reflective mechanisms (Gallagher and Meltzoff, 1996). Moreover, social comparison theory suggests that individuals assess personal traits, opinions, and competency and derive self-attributes by evaluating oneself relative to others (Festinger, 1954). Consequently, self-representations require the representations of others and mentalization of oneself in the position of others (Decety and Sommerville, 2003). According to

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Barresi and Moore (1996), social understanding of self and others or ToM necessitates effective integration of first-person and third-person intentional information, that is, personal and others' motives. Researchers have contended that failure to converge and apply both inputs results in impairments in mentalization (Barresi and Moore, 1996), and insults or abnormal activity in neural systems linked to self and other representations may underpin deficits in control of actions in psychotic disorders such as schizophrenia (Frith, 1995; Frith et al., 2000). The ability to understand and project intentionality of others and of self, therefore, relies on both internal and external social awareness. To date, the developmental sequence of mind-reading and metacognition (which precedes the other) remains a point of contention. However, several authors have suggested that data from schizophrenia research more strongly support the view that the development of mindreading precedes maturation of insight to self (Carruthers, 2009; Wiffle and David, 2009). If associations are found between impairments in representations of self and others in consumers with schizophrenia, this may indicate that treatments targeting the mentalization abilities that contribute to representations of self and others may improve insight and ToM deficits associated with poor outcome in schizophrenia.

The relationship between representations of self and others' mental states in schizophrenia is unclear, due to conflicting findings (Drake and Lewis, 2003; Bora et al., 2007). Bora et al. (2007) found an association between clinical insight and a narrative false belief task, but not with an adapted version of the Reading the Mind in the Eyes Test. Additional investigations further observed significant associations between clinical insight and ToM, as measured by a false belief task (Langdon et al., 2006; Pousa et al., 2008; Langdon and Ward, 2009), and the Hinting Task (Greig et al., 2004). Drake and Lewis (2003), however, did not find a significant association between clinical insight and a joke comprehension assessment of mental state attribution, and Langdon et al. (2006) reported a significant association between clinical and ToM measured by the joke comprehension test and a false belief narrative task, but not a story comprehension ToM test. These inconsistent findings may be due to sample differences in severity of neurocognitive impairment or symptoms or the extent to which these factors are associated with different ToM tasks. ToM task performance and cognitive and clinical insight have all been found to be associated with neurocognitive impairment (Smith et al., 2000; Roncone et al., 2002; Drake and Lewis, 2003; Rossell et al., 2003; Sergi et al., 2007; Lepage et al., 2008; Bora et al., 2009; Nair et al., 2014), positive symptoms (Roncone et al., 2002; Mintz et al., 2003; Brüne, 2005; Sprong et al., 2007; Pousa et al., 2008; Konstantakopoulos et al., 2014), and negative symptoms (Frith, 1992; Roncone et al., 2002; Mintz et al., 2003; Rossell et al., 2003; Couture et al., 2011) in schizophrenia. One recent investigation (Konstantakopoulos et al., 2014) examined the association between clinical insight and ToM in individuals with schizophrenia, independent of shared variance with neurocognition and symptom severity, and found an independent association between clinical insight and ToM, indexed by a composite score from the False Belief Task, the Hinting Task, and the Faux Pas Recognition Task.

The present study attempted to replicate this single prior finding (Konstantakopoulos et al., 2014) of an association between clinical insight and ToM that was independent of neurocognitive impairment and symptom severity. In addition, given that insight is widely accepted as a multidimensional construct (Amador et al., 1991), associations between ToM and multiple dimensions of both clinical and cognitive insight were examined. Based on the prior research reviewed above, we predicted that both clinical and cognitive insight would be significantly associated with ToM independent of shared variance with neurocognitive impairment and symptomatology.

Table 1
Participant characteristics (N=193).

	M or %	S.D.
Demographic		
Gender (male)	64.25%	–
Age (years)	46.19	10.81
Education (years)	12.35	2.00
Ethnicity (Caucasian)	57.00%	–
Housing		
Board and care housing	60.10%	–
Residing alone	12.40%	–
Residing with companion/family	23.30%	–
Homeless	1.00%	–
Medication		
Antipsychotic	97.69%	–
Mood	67.63%	–
PANSS		
Positive symptoms	16.80	6.60
Negative symptoms	15.06	6.70
Disorganization	18.99	6.75
Excitement	15.35	5.60
Emotional distress	20.48	7.05

Note: PANSS subscales were computed according to the five-factor scoring (Van der Gaag et al., 2006).

2. Methods

2.1. Participants

A total of 193 participants were recruited from local outpatient clinics and residential facilities. Of these, 141 (73%) were diagnosed with schizophrenia and 52 (27%) with schizoaffective disorder based on the *Structured Clinical Interview for DSM-IV* (SCID; First et al., 1995). Participants were excluded for neurological illness, traumatic brain injury, or substance dependence (DSM-IV criteria in the past 6 months). Table 1 outlines the participants' demographic information. The Positive and Negative Syndrome Scale (PANSS; Kay et al., 1987) was administered and scored according to the five-factor model (Van der Gaag et al., 2006), with the exclusion of the insight item G12. Table 1 presents these PANSS factor scores and other participant characteristics.

2.2. Measures

The Hinting Task (Greig et al., 2004) was used to assess ToM. On the Hinting Task, participants interpret the intentions of others in 10 auditory vignettes of social interactions between two characters. Within each vignette, the participant is first offered a statement pertaining to the environmental context where the characters are interacting (e.g., "Melissa goes to the bathroom to take a shower. Anne has just had a bath"). Subsequently, one character verbalizes a hint to the other (e.g., "Melissa notices that the bathtub is dirty so she called upstairs to Anne, 'Couldn't you find the Ajax, Anne?'"). The participant is then asked to explain what the hint meant (e.g., "What does Melissa really mean when she says this?"). Two points were awarded for the item when a correct response was given, and if the first response was incorrect, additional hints were provided (e.g., "Melissa goes on to say, 'You're very lazy sometimes, Anne.' What does Melissa want Anne to do?"). If the participant provided the correct response after the additional hint, one point was earned. The version of the Hinting Task used in this study included a manipulation of speech prosody to draw attention to the hint. Findings regarding the effect of prosody are reported elsewhere (Fish, 2009). The vignettes were presented via digital recording by a professional actor who read each item either in a neutral voice or with prosody emphasis during the hint. Two forms were devised by splitting the 10 items into even and odd items, and half the participants received even items with prosody emphasis and odd items in a neutral voice and half received odd items with prosody and even items in a neutral voice. Performance in neutral and prosody conditions did not differ significantly in the present study (Neutral: $M=6.46$, $S.D.=2.80$; Prosody: $M=6.61$, $S.D.=2.79$, $t(192)=0.63$, $p=0.53$), and the 10-item measure was found to have adequate internal consistency ($\alpha=0.80$), so the total score for the 10 items (maximum score of 20) was used.

To assess insight, the Birchwood Insight Scale (BIS; Birchwood et al., 1994) and Beck Cognitive Insight Scale (BCIS; Beck et al., 2004) were administered. The BIS contains eight items scored on a three-point scale (2="Agree", 1="Unsure", 0="Disagree") to generate the following subscales: Awareness of Illness (BIS-AoI; two items, e.g., "I am mentally well"), Relabeling of Symptoms (BIS-RoS; two items, e.g., "Some of the symptoms were made by my mind"), and Need for Treatment (BIS-NT; four items, e.g., "I do not need medication"). Items were summed for each subscale and the total score was the sum of all items (range=0–16). As reported by Birchwood et al. (1994), the internal consistency of the overall BIS is $\alpha=0.75$, and

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